

DEI Minute: Citation Bias

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Citation Bias: Definitions

Confirmation Bias

- Limiting citations to other work that support your findings and excluding work that contradicts it

DEI-related Citation Bias

- Research shows citation gaps by race/ethnicity^{1,2}, gender³, & country of origin⁴ for peer-reviewed scientific papers:

2006 Impact Factors for papers from⁴:

<i>J. Amer. Chem. Soc.</i>	4.00	
<i>Phys. Rev. Let.</i>	2.62	6.05

(1) Hofstra *et al.*, “The Diversity-Innovation Paradox in Science,” *Proceedings of the National Academy of Science* (2020).

(2) Ginther *et al.*, “Publications as Predictors of Racial & Ethnic Differences in NIH Awards,” *PLOS One* (2018).

(3) Davies *et al.*, “Promoting Inclusive Metrics of Success & Impact to Dismantle a Discriminatory Reward System in Science,” *PLoS Biology* (2021).

(4) Meneghini, Packer, & Nassi-Calò, “Articles by Latin American Authors in Prestigious Journals Have Fewer Citations,” *PLOS One* (2008).

Why do we care about citation bias?

- Most simply, it takes us away from the meritocracy we aspire to and limits our science
- Combating it can provide personal benefits -- expanding your citations horizons can expand your own network, collaborations and insight!

Citations are like “currency” for career advancement, “represent an architecture or network of resources and relationships that constitute the science,” represent records of science

“If citations direct the trajectory of scientific discovery, shaping the very formulation of our research questions, then an imbalance in citations is an imbalance in whose questions get heard, repeated, investigated, and ultimately answered...”

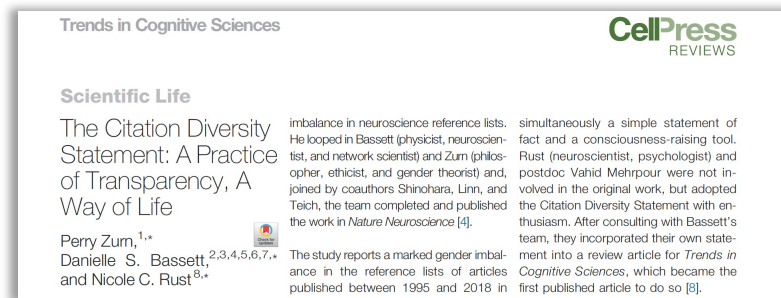
Zurn et al. “The Citation Diversity Statement: A Practice of Transparency, A Way of Life”, *Trends in Cognitive Sciences* (2020).

Additional reading: Ray et al. “Citation bias, diversity, and ethics” *Accountability in Research* (2022).

How Can We Combat DEI-related Citation Bias?

- Do not cite only the first paper or research group that comes to mind for each point needing a reference. In addition, perform a literature search to see if there are groups with relevant work in that area you were not aware of.
- Use a variety of databases for the same key word searches
 - Some databases present highly cited papers first, which can perpetuate bias and bury more relevant, but less previously cited, work
- Try a citation review
 - Send paper topics to a non-author who has experience in the field asking them for all the research groups they are aware of working on those topics

Finally, add a ***citation diversity statement*** in your publication to document how you expanded your literature search more than usual, bring awareness to this problem, and encourage other members of the research community to expand their citations (and, consequently, networks) as well.



Zurn et al. Trends in Cognitive Sciences, 2020

Compiled References

- Hofstra *et al.*, “The Diversity-Innovation Paradox in Science,” *Proceedings of the National Academy of Science* (2020). <https://doi.org/10.1073/pnas.1915378117>
- Ginther *et al.*, “Publications as Predictors of Racial & Ethnic Differences in NIH Awards,” *PLOS One* (2018). <https://doi.org/10.1371/journal.pone.0205929>
- Davies *et al.*, “Promoting Inclusive Metrics of Success & Impact to Dismantle a Discriminatory Reward System in Science,” *PLoS Biology* (2021). <https://doi.org/10.1371/journal.pbio.3001282>
- Meneghini, Packer, & Nassi-Calò, “Articles by Latin American Authors in Prestigious Journals Have Fewer Citations,” *PLOS One* (2008). <https://doi.org/10.1371/journal.pone.0003804>
- Zurn *et al.* “The Citation Diversity Statement: A Practice of Transparency, A Way of Life”, *Trends in Cognitive Sciences* (2020). <https://doi.org/10.1016/j.tics.2020.06.009>
- Ray *et al.* “Citation bias, diversity, and ethics” *Accountability in Research* (2022). <https://doi.org/10.1080/08989621.2022.2111257>